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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/752,700	01/08/2004	Kazuyuki Kuwada	Q79277	5921

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2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER	
SUCH, MATTHEW W	

ART UNIT	PAPER NUMBER
2891	

NOTIFICATION DATE	DELIVERY MODE
12/28/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

SUGHRUE265550@SUGHRUE.COM
USPTO@SUGHRUE.COM
PPROCESSING@SUGHRUE.COM

Office Action Summary	Application No.	Applicant(s)	
	10/752,700	KUWADA ET AL.	
	Examiner	Art Unit	
	MATTHEW W. SUCH	2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) *3-5* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection on 9 October 2009. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 14 September 2009 has been entered.

Information Disclosure Statement / References

2. The reference "JIS Z 0237" submitted 14 September 2009 is not being considered by the examiner because it has not been identified on an information disclosure sheet (IDS) and therefore fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. This reference has been placed in the application file, but the information referred to therein has not been considered as to the merits.

Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Objections

3. Claims 1 and 2 are objected to because of the following informalities: the phrase "a wire-less bump bonding part" in Line 4 of each claim should read "the bump bonding part"; the phrase "the sheet material" in the last line of each claim should read "the thermosetting sheet material". Appropriate correction is required.

4. Claim 2 is objected to because of the following informalities: the phrase "the back and the edges" bridging Lines 3-4 of the claim should read "a back and edges". Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moriya (`196) in view of Nishikawa (`465).

a. Regarding claim 1, the recitation of "wherein the semiconductor element has been encapsulated by coating a back and edges of the semiconductor element and a wire-less bump bonding part with a thermosetting sheet material having tackiness of 2-15 in terms

of ball tack, wherein the back and edges of the semiconductor element and bump bonding part are completely sealed by the sheet material" is not part of the scope of the claimed device. There are several reasons for this. Firstly, the claim recites "a semiconductor device which comprises a substrate and a semiconductor element mounted thereon through a bump bonding part". These are the only limitations in the claim as currently written that is part of the scope of the claimed invention. The claim never recites that the scope of the claimed device *comprises* a thermosetting sheet material on the back and edges of the semiconductor element. Instead the claim recites "wherein the semiconductor element has been encapsulated by coating a back and edges of the semiconductor element…". The examiner refers the Applicant to MPEP § 2106 II C and MPEP § 2111.04 for discussion of the non-limiting effects of "wherein" clauses without limit a claim to a particular structure. Secondly, the phrase "has been encapsulated by coating a back and edges of the semiconductor element a wire-less bump bonding part with a thermosetting material having tackiness of 2-15 in terms of ball tack" does not actually recite that the scope of the claimed device actually *comprises* the thermosetting material. Additionally, the phrase "has been encapsulated" infers that the semiconductor device was encapsulated at some time in the past without establishing that the device comprises the thermosetting material. Furthermore, the phrase "has been encapsulated by coating" is merely a product-by-process recitation. It is well settled that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In*

re Avery, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference and since the claim *fails* to require that the thermosetting material is part of the scope of the claimed device, there are no structural distinctions from this language. The phrase "wherein the back and edges of the semiconductor element and bump bonding part are completely sealed by the thermosetting sheet material" is merely an extension of these non-limiting recitations.

If the Applicant wishes to claim the thermosetting sheet material as part of the scope of the claimed device, the claim should be amended to properly incorporate these elements as proper structural limitations. However, for the purposes of compact prosecution, the examiner provisionally treats this language as part of the claimed device since this language merely introduces obvious variations as shown below.

Regarding the prior art, Moriya teaches a semiconductor device comprising a substrate (Element 11; Col. 8, Line 19, for example) and a semiconductor element (Element 13; Col. 8, Lines 20-23, for example) mounted thereon through a bump bonding part (Element 14, 14; Col. 8, Line 26 and Col. 11, Line 30, for example). The semiconductor element has been completely sealed encapsulated by coating a back and

edges with a thermosetting sheet material (Element 15, Col. 8, Lines 40-41 and Figure 1, for example). Moriya does not teach the tackiness of the thermosetting sheet material.

However, Nishikawa teaches materials useful for use with semiconductor devices (Col. 9, Lines 23-24) wherein the tackiness level measured by ball tack is between 2 to 15 (Table in Cols. 15 and 16, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the tackiness of the thermosetting resin material of Moriya to a value between 2 to 15 as taught by Nishikawa in order to ensure sufficient adhesion without peeling (Nishikawa Col. 16, Lines 13-15, for example). It has been held that where the general conditions of a claim are disclosed in prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). It is noted that the Applicant's specification refers to "ball tack" as the ball number resulting from JIS Z 0237. Nishikawa reports the values for ball tack by the methods of JIS Z 0237 (Col. 14, Lines 36-40). Nishikawa further teaches that pressure sensitive ball tackiness should be set depending on the desired application (Col. 16, Lines 3-24, for example).

b. Regarding claim 2, Moriya teaches a method for producing a semiconductor device which comprises a substrate (Element 11; Col. 8, Line 19, for example) and a semiconductor element (Element 13; Col. 8, Lines 20-23, for example) mounted thereon through a bump bonding part (Element 14, 14; Col. 8, Line 26 and Col. 11, Line 30, for example). The method comprises encapsulating semiconductor element by coating a back and edges with a thermosetting sheet material (Element 15, Col. 8, Lines 40-41, for

example) to completely seal the semiconductor element and the bump bonding part (see Figure 1, for example). Moriya does not teach the tackiness of the thermosetting sheet material.

However, Nishikawa teaches materials useful for use with semiconductor devices (Col. 9, Lines 23-24) wherein the tackiness level measured by ball tack is between 2 to 15 (Table in Cols. 15 and 16, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the tackiness of the thermosetting resin material of Moriya to a value between 2 to 15 as taught by Nishikawa in order to ensure sufficient adhesion without peeling (Nishikawa Col. 16, Lines 13-15, for example). It has been held that where the general conditions of a claim are disclosed in prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). It is noted that the Applicant's specification refers to "ball tack" as the ball number resulting from JIS Z 0237. Nishikawa reports the values for ball tack by the methods of JIS Z 0237 (Col. 14, Lines 36-40). Nishikawa further teaches that pressure sensitive ball tackiness should be set depending on the desired application (Col. 16, Lines 3-24, for example).

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moriya (`196) in view of Nishikawa (`465) as applied to claim 1 above, and further in view of Komoto (`409).

The examiner notes that the recitation of "the thermosetting sheet material is a rubbger-containing polycarbodiimide resin or rubber-modified polycarbodiimide resin" is merely an extension of non-limiting recitations as discussed above under the treatment of claim 1.

However, for the purposes of compact prosecution, the examiner provisionally treats this language as part of the claimed device since this language merely introduces obvious variations as shown below.

Continuing, Moriya in view of Nishikawa teaches the device of claim 1, but does not teach that the thermosetting sheet material is a rubber-modified polycarbodiimide resin.

However, Komoto teaches using rubber-modified polycarbodiimide resin (Abstract; Col. 5, Lines 48-53, for example) used for electronics applications. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a rubber-modified polycarbodiimide thermosetting material as taught by Komoto in the thermosetting material of Moriya in view of Nishikawa. One would have been motivated to do so since Komoto teaches that the rubber-modified polycarbodiimide thermosetting material is an excellent adhesive material for electronics applications due to the flame-retarding heat-resistance and solder-resistance properties (Komoto Col. 3, Lines 25-40; Col. 6, Lines 8-21; Col. 10, Lines 1-5; Col. 11, Lines 38-41; Col. 12, Lines 10-12; Col. 13, Line 12, for example).

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moriya (`196) in view of Nishikawa (`465) as applied to claim 1 above, and further in view of Imashiro (`711).

The examiner notes that the recitation of "the thermosetting sheet material is a rubbger-containing polycarbodiimide resin or rubber-modified polycarbodiimide resin" is merely an extension of non-limiting recitations as discussed above under the treatment of claim 1. However, for the purposes of compact prosecution, the examiner provisionally treats this

language as part of the claimed device since this language merely introduces obvious variations as shown below.

Continuing, Moriya in view of Nishikawa teaches the device of claim 1, but does not teach that the thermosetting sheet material is a rubber-modified polycarbodiimide resin.

However, Imashiro teaches using rubber-modified polycarbodiimide resin (Abstract; Col. 1, Line 13; Col. 2, Lines 45-55; Col. 5, Lines 10-17, for example) used for electronics applications. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a rubber-modified polycarbodiimide thermosetting material as taught by Imashiro in the thermosetting material of Moriya in view of Nishikawa. One would have been motivated to do so since Imashiro teaches that the rubber-modified polycarbodiimide thermosetting material is an excellent adhesive material for electronics applications due to the heat-resistance, formability, excellent adhesion strength, processability, and solder-resistance properties (Imashiro Table 2, for example).

Response to Arguments

9. Applicant's arguments with respect to claims 1-2 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Misumi (`484) teaches polycarbodiimide materials for electronics applications;

Furukawa (`513), Tomiyama (`670), Yamazaki (`614), and Bureau (`194) each teach forming thermosetting sheet materials on the back and edges of a semiconductor element.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571)272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Bryant can be reached on (571) 272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W. Such/
Examiner, Art Unit 2891